Citation:

Abbot JM, Byrd-Bredbenner C, Wheatley V, Cottone E, Clancy M. Observed hand washing behaviors of young adults during food preparation. *Food Protection Trends* 2008; 28(11):912-916.

Study Design:

Cross-sectional Study

Class:

D - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

- To observe young adults' hand washing behaviors during food preparation and compare their compliance to established guidelines for the prevention and spread of foodborne disease.
- To determine how observed hand washing behaviors compared to self-reported behaviors as well as to assess young adults' knowledge of recommended hand washing procedures.

Inclusion Criteria:

- Young adults aged 18 to 26 years
- Those who did not hold a sanitation certification
- Those in excellent health
- Those who were not at an increased risk for food borne illness (i.e. pregnant or immune-compromised).

Exclusion Criteria:

- Those who were immune-compromised
- Those who held a sanitation certification
- Those not in excellent health.

Description of Study Protocol:

Recruitment: Participants were recruited via official university listservs and campus newspaper advertisements.

Design: Cross-Sectional Study. Participants followed two simple recipes that involved handling a raw animal food that was to be cooked and then a raw vegetable ingredient that was to be served uncooked. Handwashing practices were monitored and recorded. Following food preparation participants completed a 10-item hand washing knowledge test and 4-item self-report hand washing procedures questionnaire.

Blinding used (if applicable): Subjects were blinded to the study purpose.

Intervention (if applicable): not applicable

Statistical Analysis:

- ANOVA was conducted to compare observed and self-reported hand washing practices.

Data Collection Summary:

Timing of Measurements: The specific month and year of the study was not specified.

Dependent Variables

- Handwashing procedures were monitored and recorded
- Following food preparation participants completed a 10-item hand washing knowledge test and 4-item self-report hand washing procedures questionnaire.

Independent Variables

- Participants followed two simple recipes that involved handling a raw animal food that was to be cooked and then a raw vegetable ingredient that was to be served uncooked.
- Trained observers observed whether participants washed their hands on the following occasions: before beginning food preparation, after handling unwashed produce, after handling raw poultry, and as necessary (after touching hair, taking a break to answer the phone, using the restroom).

Control Variables

Description of Actual Data Sample:

Initial N: 167 individuals were eligible to participate

Attrition (final N): 153 individuals honored their scheduled appointment time.

Age: 18 to 26 years. Mean age was 20.73 years.

Ethnicity: Participants were 67% white.

Other relevant demographics:

- Participants were 56% female, 85% upperclassmen.
- Ninety nine percent prepared at least one meal weekly.
- Sixty percent had never had a job serving food and 77% had never had a job preparing food.
- More than 90% had never completed a university course in nutrition, food science, or microbiology.

Anthropometrics:

Location: Rutgers University, New Jersey

Summary of Results:

Key findings:

- Mean handwashing knowledge was high at 72%.
- Only 36 percent knew the most hygienic way to wash hands.
- Only 16 percent were engaging in hygienic hand washing during the recipe preparation.
- Participants were observed performing only 25% of recommended hand washing practices but reported they performed half of the recommended practices.
- 60% of participants were observed washing their hands before beginning food preparation with at least water.
- 54% of participants used soap to wash their hands before beginning food preparation.
- 16% of participants rubbed their hands together for 20 seconds during washing.
- During food preparation, nearly 60% did not wash their hands with soap and water after touching raw poultry.
- Females scored higher than males on a handwashing compliance scale and were more likely than males to wash their hands with soap and water after handling raw poultry (45% vs. 35%).

Hand washing observation checklist percent of young adults observed engaging in each practice (n=153)

	Hands were washed	Running water was used	Soap was used	Hands were rubbed together for ≥20 secs
Hand washing occasion	% Observed	% Observed	% Observed	% Observed
Before Food Handling Began	60	60	54	16
After Handling Raw Produce	14	14	7	0
After Handling Raw Poultry	63	63	41	10
As Necessary	4	5	4	1

As necessary-hands were washed following each absence from the food preparation work station (eg bathroom breaks, phone calls), touching body parts, coughing/sneezing, or blowing nose.

Self-reported Handwashing Behaviors

Self-Reported Handwashing Procedures	Participant Answer (%)
Right after handling raw meat, raw chicken, or raw fish, what do you usually do?	
Continue Cooking	3

Rinse my hands with water	27
Wipe my hands on a paper/dish towel	2
Wash my hands with soap*	63
I never handle raw meat or chicken	5
Before you begin preparing food, how often do you wash your hands with soap?	
All of the time*	39
Most of the time	37
Some of the time	17
Rarely	7
Which is the most hygienic way to wash your hands?	
1. Apply sanitizer, run water,rub hands together for 20 seconds, rinse hands, dry hands, rub on an antiseptic hand lotion.	11
2. Apply soap, rub together for 20 seconds, rinse hands under water, dry hands, apply sanitizer	25
3. Run water, moisten hands, apply soap, rub hands together for 20 seconds, rinse hands, dry hands**	36
4. Run water, moisten hands, apply sanitizer, rub hands together for 20 seconds, rinse hands, dry hands, rub on antiseptic hand lotion	28

* Best practice

** Correct answer

Author Conclusion:

The findings of this study indicate that young adults fail to follow recommended hand washing procedures before and during food handling. Further, young adults report better hand washing practices than are actually observed.

Reviewer Comments:

Authors note the following limitations:

- *Sample was limited to small number of self-selected young adults*
- *Direct observation of participants may have encouraged hand washing*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions		
1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	Yes
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	Yes

Validity Questions		
1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	???
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	???
3.	**Were study groups comparable?**	N/A
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	N/A
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A

3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	N/A
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	N/A
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	N/A
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	Yes
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	N/A
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes

6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	???
7.1.	Were primary and secondary endpoints described and relevant to the question?	N/A
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	???
7.5.	Was the measurement of effect at an appropriate level of precision?	???
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	N/A
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	???
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	N/A
8.6.	Was clinical significance as well as statistical significance reported?	Yes

8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes